

Claims

What is claimed is:

1. A method for combining signals for transmission between masthead  
5 electronics and base housing electronics in a base station  
environment, the method comprising:
  - a) receiving a first receive signal centered about a first center  
frequency from a first antenna;
  - b) receiving a second receive signal centered about the first center  
10 frequency from a second antenna;
  - c) translating the first receive signal from the first antenna to being  
centered about a second center frequency; and
  - d) combining the first receive signal centered about the second  
center frequency and the second receive signal to form a  
15 composite signal, which is sent to the base housing electronics  
over a feeder cable.
2. The method of claim 1 wherein the first receive signal centered about  
the second center frequency is combined with the second receive  
20 signal centered about the first center frequency to form the composite  
signal.
3. The method of claim 2 wherein the first center frequency and the  
second center frequency are sufficiently spread to minimize  
25 interference between the first and second receive signals in the  
composite signal.
4. The method of claim 1 further comprising translating the second  
receive signal from the second antenna to being centered about a third  
30 center frequency, wherein the first receive signal centered about the  
second center frequency is combined with the second receive signal  
centered about the third center frequency to form the composite signal.

5. The method of claim 4 wherein the second center frequency and the third center frequency are sufficiently spread to minimize interference between the first and second receive signals in the composite signal.

5 6. The method of claim 1 wherein the second antenna is a main antenna also used to transmit signals centered about the first center frequency and the first antenna is a diversity antenna associated with the second antenna, the method further comprising transmitting a transmit signal via the main antenna.

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7. The method of claim 1 wherein a plurality of receive signals, including the second receive signal, are received and translated to being centered about different center frequencies and combined to form the composite signal.

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8. The method of claim 1 further comprising:  
a) separating the first and second receive signals from the composite signal in the base station electronics; and  
b) providing the first and second receive signals to transceiver circuitry.

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9. The method of claim 8 further comprising translating the first receive signal to being centered about the first center frequency prior to providing the first receive signal to the transceiver circuitry.

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10. The method of claim 9 wherein the second receive signal is translated to a third center frequency before being combined with the first receive signal to form the composite signal, and further comprising translating the second receive signal to being centered about the first center frequency prior to providing the second receive signal to the transceiver circuitry.

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11. The method of claim 1 wherein the first and second receive signals correspond to a cellular signal transmitted from a cellular communication device.

5 12. The method of claim 1 wherein the first and second antennas are associated with one of a plurality of sectors for the base station environment.

10 13. The method of claim 12 wherein each sector uses one feeder cable between the masthead electronics and the base housing electronics.

14. The method of claim 1 wherein the first center frequency is associated with a first cellular band and a fourth center frequency is associated with a second cellular band, the method further comprising:

15 a) receiving a third receive signal centered about a third center frequency from the first antenna;  
b) receiving a fourth receive signal centered about the third center frequency from the second antenna;  
c) translating the third receive signal from the first antenna to being centered about a fourth center frequency; and  
20 d) combining the third receive signal centered about the third center frequency and the second receive signal to form at least part of the composite signal, which is sent to the base housing electronics over the feeder cable.

25 15. The method of claim 14 further comprising translating the fourth receive signal from the second antenna to being centered about the fourth center frequency, wherein the third receive signal centered about the fourth center frequency is combined with the fourth receive signal centered about the fourth center frequency to form at least part of the composite signal.

16. Base station electronics for combining signals for transmission between a masthead and a base housing in a base station environment, the base station electronics comprising in the masthead:

- a) a first input adapted to receive a first receive signal centered about a first center frequency from a first antenna;
- b) a second input adapted to receive a second receive signal centered about the first center frequency from a second antenna;
- c) first translation circuitry adapted to translate the first receive signal from the first antenna to being centered about a second center frequency; and
- d) combining circuitry adapted to combine the first receive signal centered about the second center frequency and the second receive signal to form a composite signal, which is sent to base housing electronics over a feeder cable.

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17. The base station electronics of claim 16 wherein the first receive signal centered about the second center frequency is combined with the second receive signal centered about the first center frequency to form the composite signal.

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18. The base station electronics of claim 17 wherein the first center frequency and the second center frequency are sufficiently spread to minimize interference between the first and second receive signals in the composite signal.

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19. The base station electronics of claim 16 further comprising second translation circuitry adapted to translate the second receive signal from the second antenna to being centered about a third center frequency, wherein the first receive signal centered about the second center frequency is combined with the second receive signal centered about the third center frequency to form the composite signal.

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20. The base station electronics of claim 19 wherein the second center frequency and the third center frequency are sufficiently spread to

minimize interference between the first and second receive signals in the composite signal.

21. The base station electronics of claim 16 wherein the second antenna is  
5 a main antenna also used to transmit signals centered about the first center frequency, and the first antenna is a diversity antenna associated with the second antenna, the base station electronics further comprising circuitry adapted to transmit a transmit signal via the main antenna.

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22. The base station electronics of claim 16 wherein a plurality of receive signals, including the second receive signal, are received and translated to being centered about different center frequencies and combined to form the composite signal.

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23. The base station electronics of claim 16 further comprising in the base housing:

- a) transceiver circuitry; and
- b) separation circuitry adapted to separate the first and second receive signals from the composite signal in the base station electronics, wherein the first and second receive signals are provided to transceiver circuitry.

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24. The base station electronics of claim 23 further comprising, in the base housing, second translation circuitry adapted to translate the first receive signal to being centered about the first center frequency prior to providing the first receive signal to the transceiver circuitry.

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25. The base station electronics of claim 24 wherein the second receive signal is translated to a third center frequency before being combined with the first receive signal to form the composite signal, and further comprising third translation circuitry adapted to translate the second receive signal to being centered about the first center frequency prior to providing the second receive signal to the transceiver circuitry.

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26. The base station electronics of claim 16 wherein the first and second receive signals correspond to a cellular signal transmitted from a cellular communication device.

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27. The base station electronics of claim 16 wherein the first and second antennas are associated with one of a plurality of sectors for the base station environment.

10 28. The base station electronics of claim 27 wherein each sector uses one feeder cable between the masthead and the base housing.

29. The base station electronics of claim 16 wherein the first center frequency is associated with a first cellular band and a fourth center

15 frequency is associated a second cellular band; a third receive signal centered about a third center frequency is received via the first input from the first antenna; a fourth receive signal centered about the third center frequency is received via the second input from the second antenna, the base station electronics in the masthead further

20 comprising second translation circuitry adapted to translate the third receive signal from the first antenna to being centered about a fourth center frequency, the combining circuitry further adapted to combine the third receive signal centered about the third center frequency and the second receive signal to form at least part of the composite signal,

25 which is send to the base housing over the feeder cable.

30. The base station electronics of claim 29 further comprising third translation circuitry adapted to translate the fourth receive signal from the second antenna to being centered about the fourth center frequency, wherein the third receive signal centered about the fourth center frequency is combined with the fourth receive signal centered about the fourth center frequency to form at least part of the composite signal.

31. A system for combining signals for transmission between masthead electronics and base housing electronics in a base station environment, the method comprising:

- 5           a) means for receiving a first receive signal centered about a first center frequency from a first antenna;
- b) means for receiving a second receive signal centered about the first center frequency from a second antenna;
- c) means for translating the first receive signal from the first antenna to being centered about a second center frequency; and
- 10           d) means for combining the first receive signal centered about the second center frequency and the second receive signal to form a composite signal, which is sent to the base housing electronics over a feeder cable.